# Neurobiology

## **Volume Contents**

Vol. 25, No. 1, January 1994

Claustrin, An Antiadhesive Neural Keratan Sulfate Proteoglycan, Is Structurally Related to MAP1B  $\,/\,$  1

Michael A. Burg and Gregory J. Cole

A Putative Nicotine Pump at the Metabolic Blood-Brain Barrier of the Tobacco Hornworm  $\,/\,23\,$ 

Christine L. Murray, Michele Quaglia, John T. Arnason, and Catherine E. Morris

Central Projection of Auditory Receptors in the Prothoracic Ganglion of the Bushcricket *Psorodonotus illyricus* (Tettigoniidae): Computer-Aided Analysis of the End Branch Pattern / 35

Ruettger Ebendt, Joerg Friedel, and Klaus Kalmring

Sexual Differences in the Numerical Density of Synaptic Profiles of Developing Rat Visual Cortex  $\,/\,$  50

José Antonio Muñoz-Cueto and Antonio Ruiz-Marcos

Inhibitory Effects of Actinomycin D and Cycloheximide on Neuronal Death in Adult Manduca sexta / 59

S. E. Fahrbach, M. Kim Choi, and J. W. Truman

Identification of a 70 kD Protein with Sequence Homology to Squid Neurofilament Protein in Glial Cells of the Leech CNS  $\,/\,$  70

Theres E. Lüthi, Daniela L. Brodbeck, and Paul Jenö

Substrate-Dependent Interactions of Leech Microglial Cells and Neurons in Culture / 83

L. M. Masuda-Nakagawa, A. Walz, D. Brodbeck, M. D. Neely, and S. Grumbacher-Reinert

Regulation of Immediate-Early Gene Expression in Rat Retinal Ganglion Cells after Axotomy and during Regeneration through a Peripheral Nerve Graft / 92 Michael Hüll and Mathias Bähr

Vol. 25, No. 2, February 1994

Charles M. Lent, 1936–1993 / 107 Michael H. Dickinson

Galanin and Vasoactive Intestinal Peptide Messenger RNAs Increase Following Axotomy of Adult Sympathetic Neurons / 108
Robert P. Mohney, Ruth E. Siegel, and Richard E. Zigmond

Developmental Temperature Selectively Regulates a Voltage-Activated Potassium Current in *Drosophila / 119*Maninder Chopra and Satpal Singh

Expression of NGF Receptor and GAP-43 mRNA in DRG Neurons during Collateral Sprouting and Regeneration of Dorsal Cutaneous Nerves / 127 K. M. Mearow, Y. Kril, A. Gloster, and J. Diamond

Hu Neuronal Proteins Are Expressed in Proliferating Neurogenic Cells / 143 Michael F. Marusich, Henry M. Furneaux, Paul D. Henion, and James A. Weston

Colocalization of Tyrosine Hydroxylase and Fos in the Male Syrian Hamster Brain Following Different States of Arousal / 156
Stephen E. Asmus and Sarah W. Newman

OS9: A Novel Olfactory Gene of *Drosophila* Expressed in Two Olfactory Organs / 169
Debasish Raha and John Carlson

Local Intracerebral Implants of Estrogen Masculinize Some Aspects of the Zebra Finch Song System / 185
William Grisham, Greta A. Mathews, and Arthur P. Arnold

Female Marsh Wrens Do Not Provide Evidence of Anatomical Specializations of Song Nuclei for Perception of Male Song / 197

Eliot A. Brenowitz, Belinda Nalls, Donald E. Kroodsma, and Cynthia Horning

Neurite Outgrowth from Cultured CNS Neurons Is Promoted by Inhibitors of Protein and RNA Synthesis / 209

Jean-Claude Louis, Patricia Burnham, and Silvio Varon

Vol. 25, No. 3, March 1994

## Special Issue CALCIUM AND NEURONAL PLASTICITY

Calcium and Neuronal Plasticity / 219
Phillip G. Nelson and R. Douglas Fields

Confocal Laser Scanning Microscopy Reveals Voltage-Gated Calcium Signals within Hippocampal Dendritic Spines / 220
David B. Jaffe, Stephen A. Fisher, and Thomas H. Brown

Calcium Signaling in Dendritic Spines of Hippocampal Neurons / 234

John A. Connor, Lucas D. Pozzo Miller, Jeffrey Petrozzino, and Wolfgang Müller

Spontaneous  $Ca^{2+}$  Transients in Developing Hippocampal Pyramidal Cells / 243 Michael E. Dailey and Stephen J Smith

Intracellular Calcium Mobilization and Neurite Outgrowth in Mammalian Neurons  $/\ 252$ 

Jeffery D. Kocsis, Mark N. Rand, Karen L. Lankford, and Stephen G. Waxman

Nonlinear Propagation of Agonist-Induced Cytoplasmic Calcium Waves in Single Astrocytes  $/\ 265$ 

Sergey V. Yagodin, Lynne Holtzclaw, Carol A. Sheppard, and James T. Russell

Resonant Activation of Calcium Signal Transduction in Neurons / 281 R. Douglas Fields and Phillip G. Nelson

Calcium Regulation of Gene Expression in Neuronal Cells / 294
Anirvan Ghosh, David D. Ginty, Hilmar Bading, and Michael Greenberg

Excitatory Interactions between Glutamate Receptors and Protein Kinases / 304 T. R. Soderling, S. E. Tan, E. McGlade-McCulloh, H. Yamamoto, and K. Fukunaga

The Plasma Membrane Calcium Pump: Functional Domains, Regulation of the Activity, and Tissue Specificity of Isoform Expression / 312

Ernesto Carafoli and Thomas Stauffer

Proteolytic Activity, Synapse Elimination, and the Hebb Synapse / 325 Y. Liu, R. D. Fields, S. Fitzgerald, B. W. Festoff, and P. G. Nelson

Calcium-Dependent Postsynaptic Exocytosis: A Possible Mechanism for Activity-Dependent Synaptic Modulation / 336

Yang Dan and Mu-ming Poo

Subject Index to Special Issue on Calcium and Neuronal Plasticity / 342

## Vol. 25, No. 4, April 1994

Axonal Outgrowth within the Abnormal Scaffold of Brain Tracts in a Zebrafish Mutant / 345

Chetan K. Patel, Luis C. Rodriguez, and John Y. Kuwada

Proposed Pathways for Vocal Self-Stimulation: met-Enkephalinergic Projections Linking the Midbrain Vocal Nucleus, Auditory-Responsive Thalamic Regions and Neurosecretory Hypothalamus / 361 Mei-Fang Cheng and Mingxue Zuo

Vasopressin-Induced Neurotrophism in Cultured Hippocampal Neurons via V<sub>1</sub> Receptor Activation / 380 Roberta Diaz Brinton, Alex W. Monreal, and Judivick G. Fernandez

Rin, a Novel Cell-Surface Protein that Labels Reticular Neurons Early in Chick Neurogenesis / 395
Susannah Chang and David W. Raible

Divergent Axon Collaterals Originate in the Estrogen Receptive Ventromedial Nucleus of Hypothalamus in the Rat / 406
Thomas R. Akesson, Catherine Ulibarri, and Sharon Truitt

Regulation of Vasoactive Intestinal Peptide Expression in Sympathetic Neurons in Culture and after Axotomy: The Role of Cholinergic Differentiation Factor/Leukemia Inhibitory Factor / 415

Yi Sun, Mahendra S. Rao, Richard E. Zigmond, and Story C. Landis

Apoptosis in Adult Retinal Ganglion Cells after Axotomy / 431 E. Garcia-Valenzuela, W. Gorczyca, Z. Darzynkiewicz, and S. C. Sharma

Secreted Forms of  $\beta$ -Amyloid Precursor Protein Modulate Dendrite Outgrowth and Calcium Responses to Glutamate in Cultured Embryonic Hippocampal Neurons / 439

Mark P. Mattson

Acceleration by NMDA Treatment of Visually Induced Map Reorganization in Juvenile *Xenopus* after Larval Eye Rotation / 451

Jafar Bandarchi, Warren J. Scherer, and Susan B. Udin

#### **ERRATUM**

Ultrastructure of Neuromuscular Junctions in *Drosophila*: Comparison of Wild Type and Mutants with Increased Excitability / 461 X.-X. Jia, M. Gorczyca, and V. Budnik

## Vol. 25, No. 5, May 1994

Regeneration and Molting Effects on a Proprioceptor Organ in the Dungeness Crab, Cancer magister / 461

H. Bernard Hartman and Robin L. Cooper

Cell Adhesion Molecules in the Early Developing Mouse Retina: Retinal Neurons Show Preferential Outgrowth in vitro on L1 but Not N-CAM / 472

Mark H. Hankin and Carl F. Lagenaur

Glutamate Receptor Binding in Juvenile and Adult Rana pipiens CNS / 488 Hollis T. Cline, J. W. McDonald, and Martha Constantine-Paton

Neurotrophic Regulation of Mouse Muscle  $\beta$ -Amyloid Protein Precursor and  $\alpha_1$ -Antichymotrypsin as Revealed by Axotomy / 503 Mohammed Akaaboune, Jianxin Ma, Barry W. Festoff, Barry D. Greenberg, and Daniel Hantaï

Spatiotemporal Pattern of Expression of Tenascin-Like Molecules in a Developing Insect Olfactory System / 515

Catherine E. Krull, David B. Morton, Andreas Faissner, Melitta Schachner, and Leslie P. Tolbert

Influence of Interganglionic Interactions on Steroid-Mediated Dendritic Reorganization and Death of Proleg Motor Neurons during Metamorphosis in *Manduca sexta* / 535 Janis C. Weeks and Seana K. Davidson C-Kinase Manipulations Disrupt Activity-Driven Retinotopic Sharpening in Regenerating Goldfish Retinotectal Projection / 555

John T. Schmidt

Expression of trkC Receptor mRNA during Development of the Avian Nervous System / 571
Nitza Kahane and Chava Kalcheim

The Survival of Rat Cerebral Cortical Neurons in the Presence of Trophic APP Peptides  $\,/\,$  585

Kyoko Yamamoto, Toshio Miyoshi, Tetsuji Yae, Kazuaki Kawashima, Hiroaki Araki, Kazunori Hanada, Deborah A. C. Otero, Jean-Marc Roch, and Tsunao Saitoh

Vol. 25, No. 6, June 1994

## Special Issue RETROGRADE SIGNALING AT THE SYNAPSE

Retrograde Signaling at the Synapse / 595 R. K. Murphey and Graeme W. Davis

NGF and the Local Control of Nerve Terminal Growth / 599 Robert B. Campenot

Target-Derived Molecules that Influence the Development of Neurons in the Avian Ciliary Ganglion / 612

Rae Nishi

Target Determination of Neurotransmitter Phenotype in Sympathetic Neurons / 620 Robert Schotzinger, Xinghuan Yin, and Story Landis

Cell-Cell Interactions that Modulate Neuronal Development in the Leech / 640 Kathleen A. French and William B. Kristan, Jr.

Nitric Oxide and Carbon Monoxide as Possible Retrograde Messengers in Hippocampal Long-Term Potentiation / 652 R. D. Hawkins, M. Zhuo, and O. Arancio

Postsynaptic Regulation of the Development and Long-Term Plasticity of *Aplysia* Sensorimotor Synapses in Cell Culture / 666

David L. Glanzman

Retrograde Regulation of Presynaptic Development during Synaptogenesis / 694 P. G. Haydon and M. J. Zoran

Retrograde Determination of Motoneuron Properties and Their Synaptic Input / 707

Lorne M. Mendell, William F. Collins III, and John B. Munson

Retrograde Signaling in the Formation and Maintenance of the Neuromuscular Junction  $/\ 722$ 

Elizabeth A. Connor and Martin A. Smith

Retrograde Signaling and the Development of Transmitter Release Properties in the Invertebrate Nervous System / 740

Graeme W. Davis and R. K. Murphey

Subject Index to Special Issue on Retrograde Signaling at the Synapse / 757

Vol. 25, No. 7, July 1994

Neurotrophic Agents Prevent Motoneuron Death Following Sciatic Nerve Section in the Neonatal Mouse / 759

Linxi Li, Ronald W. Oppenheim, Ming Lei, and Lucien J. Houenou

Characterization and Localization of D1 Dopamine Receptors in the Sexually Dimorphic Vocal Control Nucleus, Area X, and the Basal Ganglia of European Starlings / 767

Joseph M. Casto and Gregory F. Ball

Growth Behavior of Retinotectal Axons in Live Zebrafish Embryos under TTX-Induced Neural Impulse Blockade / 781
Rolf J. Kaethner and Claudia A. O. Stuermer

FGF and EGF Are Mitogens for Immortalized Neural Progenitors / 797 Daniel L. Kitchens, Evan Y. Snyder, and David I. Gottlieb

Thyroxine Treatment and the Recovery of Pyramidal Cells of the Cerebral Cortex from Changes Induced by Juvenile-Onset Hypothyroidism / 808

Antonio Ruiz-Marcos, Pedro Cartagena-Abella, Juan Ramón Martinez-Galan,
Rosa Calvo, Gabriela Morreale de Escobar, and Francisco Escobar del Rey

Dynamics and Metamorphosis of an Identifiable Peptidergic Neuron in an Insect / 819

Lynn M. Riddiford, Randall S. Hewes, and James W. Truman

The Molecular Cloning and Characterization of Potential Chick DM-GRASP Homologs in Zebrafish and Mouse / 831

John P. Kanki, Susannah Chang, and John Y. Kuwada

Origin and Clonal Relationship of Common Inhibitory Motoneurons  $\text{Cl}_1$  and  $\text{Cl}_3$  in the Locust CNS / 846 Harald Wolf and Dirk M. Lang

Sexual Differentiation of Brain and Behavior in the Zebra Finch: Critical Periods for Effects of Early Estrogen Treatment / 865

E. Adkins-Regan, V. Mansukhani, C. Seiwert, and R. Thompson

Differential Effects of Dihydrotestosterone and Estrogen on the Development of Motoneuron Morphology in a Sexually Dimorphic Rat Spinal Nucleus / 878 L. A. Goldstein and D. R. Sengelaub

#### **ERRATUM**

Ultrastructure of Neuromuscular Junctions in *Drosophila*: Comparison of Wild Type and Mutants with Increased Excitability / 893
Xi-Xi Jia, Michael Gorczyca, and Vivian Budnik

### Vol. 25, No. 8, August 1994

Effects of Testosterone on a Sexually Dimorphic Frog Muscle: Repeated in vivo Observations and Androgen Receptor Distribution / 897

Marlies Dorlöchter, Stephanie H. Astrow, and Albert A. Herrera

Motor Dynamics of Song Production by Mimic Thrushes / 917 Roderick A. Suthers, Franz Goller, and Rebecca S. Hartley

Differential Neural Regulation of a Neuromuscular Junction-Associated Antigen in Muscle Fibers and Schwann Cells / 937
Stephanie H. Astrow, Young-Jin Son, and Wesley J. Thompson

Neurotrophin-4/5 (NT-4/5) Increases Adult Rat Retinal Ganglion Cell Survival and Neurite Outgrowth in vitro / 953
A. Cohen, G. M. Bray, and A. J. Aguayo

Sequencing and Promoter Analysis of the Genomic Region between the Rat Neuronal Nicotinic Acetylcholine Receptor  $\beta4$  and  $\alpha3$  Genes / 960 R. Thomas Boyd

Reciprocal Regulation of Estrogen and NGF Receptors by Their Ligands in PC12 Cells / 974
Farida Sohrabji, Lloyd A. Greene, Rajesh C. Miranda,

and C. Dominique Toran-Allerand

In vitro Analyses of Neurite Outgrowth Indicate a Potential Role for Tenascin-Like Molecules in the Development of Insect Olfactory Glomeruli / 989

Catherine E. Krull, Lynne A. Oland, Andreas Faissner, Melitta Schachner, and Leslie P. Tolbert

Motoneurons Deprived of Trophic Support in vitro Require New Gene Expression to Undergo Programmed Cell Death / 1005

C. E. Milligan, R. W. Oppenheim, and L. M. Schwartz

Selective Expression of Glionexin, a Glial Glycoprotein, in Insect Mechanoreceptors / 1017 L. H. Field, M. R. Meyer, and J. S. Edwards

Cell Surface Contact Mediates Neuronal Recognition and Synapse Formation between Two Identified Leech Neurons / 1029 David C. Merz and Pierre Drapeau

## Vol. 25, No. 9, September 1994

Sexual Differentiation in the CNS of the Moth, *Manduca sexta*. I. Sex and Segment-Specificity in Production, Differentiation, and Survival of the Imaginal Midline Neurons / 1039

Robert S. Thorn and James W. Truman

Sexual Differentiation in the CNS of the Moth, *Manduca sexta*. II. Target Dependence for the Survival of the Imaginal Midline Neurons / 1054

Robert S. Thorn and James W. Truman

Neural Organization of the Ventilatory Activity in the Frog,  $\it Rana\ catesbeiana.\ I\ /\ 1067$ 

Naoki Kogo, Steven F. Perry, and John E. Remmers

Neural Organization of the Ventilatory Activity in the Frog,  $\it Rana\ catesbeiana.\ II\ /\ 1080$ 

Naoki Kogo and John E. Remmers

The TRH Neuronal Phenotype Forms Embryonic Cell Clusters that Go on to Establish a Regionalized Cell Fate in Forebrain / 1095
William Pär Hayes

Responses of Thoracic Interneurons to Tactile Stimulation in the Cockroach, Periplaneta americana / 1113

Roy E. Ritzmann and Alan J. Pollack

Regulation of SC1/DM-GRASP During the Migration of Motor Neurons in the Chick Embryo Brain Stem / 1129

Houst Simon Saud Guthria and Andrew Lympeden

Horst Simon, Sarah Guthrie, and Andrew Lumsden

Muscarinic Acetylcholine Responses in the Early Embryonic Chick Retina / 1144 Masayuki Yamashita, Yukiko Yoshimoto, and Yutaka Fukuda

Lateralization and Motor Stereotypy of Song Production in the Brown-Headed Cowbird / 1154

Susan E. Allan and Roderick A. Suthers

Re-evaluation of the Absolute Threshold and Response Mode of the Most Sensitive Known "Vibration" Detector, the Cockroach's Subgenual Organ: A Cochlea-Like Displacement Threshold and a Direct Response to Sound / 1167 Stephen R. Shaw

## Vol. 25, No. 10, October 1994

Specific Pathway Selection by the Early Projections of Individual Peripheral Sensory Neurons in the Embryonic Medicinal Leech / 1187 John Jellies, Kristen Johansen, and Jørgen Johansen

Identification of CDK- and Cyclin-Like Proteins in the Eye of *Bulla gouldiana* / 1200
Nancy A. Krucher and Michael H. Roberts

Anti-\(\beta\)1 Integrin Antibody Inhibits Schwann Cell Myelination / 1207
Cristina Fernandez-Valle, Lisa Gwynn, Patrick M. Wood, Salvatore Carbonetto,

and Mary Bartlett Bunge

Neuronal Differentiation of PC12 Cells as a Result of Prevention of Cell Death by  $bcl-2 \ / \ 1227$ 

Noboru Sato, Kazuhiko Hotta, Satoshi Waguri, Tohru Nitatori, Koujiro Tohyama, Yoshihide Tsujimoto, and Yasuo Uchiyama

Maturation of Neurites in Mixed Cultures of Spinal Cord Neurons and Muscle Cells from *Xenopus laevis* Embryos Followed with Antibodies to Neurofilament Proteins / 1235

Weichun Lin and Ben G. Szaro

Influence of Factors Released from Sciatic Nerve on Adult Dorsal Root Ganglion Neurons / 1249

Maxim Dobretsov, Anna Dobretsov, and Damien P. Kuffler

Neurotrophic Influence of Denervated Sciatic Nerve on Adult Dorsal Root Ganglion Neurons  $\,/\,$  1267

Damien P. Kuffler and Olga Megwinoff

Neuronal Responses to Purinoceptor Agonists in the Leech Central Nervous System / 1283

Kurt H. Backus, Susanne Braum, Frank Lohner, and Joachim W. Deitmer

Expression of Winged Helix Genes, BF-1 and BF-2, Define Adjacent Domains within the Developing Forebrain and Retina / 1293

Victor Hatini, Wufan Tao, and Eseng Lai

Kinase Requirement for Retinal Growth Cone Motility / 1310 X. Jian, H. Hidaka, and J. T. Schmidt

Vol. 25, No. 11, November 1994

## Special Issue NEUROTROPHIC FACTORS

Neurotrophic Factors: An Evolutionary Perspective / 1329 Yves-Alain Barde

The Role of Neurotrophins in the Developing Nervous System / 1334 Alun M. Davies

Structure-Function Relationships in the Neurotrophin Family / 1349 Carlos F. Ibáñez

Activity-Dependent and Hormonal Regulation of Neurotrophin mRNA Levels in the Brain—Implications for Neuronal Plasticity / 1362

Dan Lindholm, Eero Castrén, Maria Berzaghi, Andrea Blöchl, and Hans Thoenen

The p75 Neurotrophin Receptor / 1373 Moses V. Chao

The Trk Family of Neurotrophin Receptors / 1386 Mariano Barbacid

Neurotrophin Signal Transduction by the Trk Receptor / 1404 David R. Kaplan and Robert M. Stephens

Neurotrophic Factor Therapy for Nervous System Degenerative Diseases / 1418 Franz Hefti

Ciliary Neurotrophic Factor / 1436
M. Sendtner, P. Carroll, B. Holtmann, R. A. Hughes, and H. Thoenen

The Tripartite CNTF Receptor Complex: Activation and Signaling Involves Components Shared with Other Cytokines / 1454

Neil Stahl and George D. Yancopoulos

Fibroblast Growth Factors in the Nervous System / 1467 Felix P. Eckenstein

Subject Index to Special Issue of Neurotrophic Factors / 1481

### Vol. 25, No. 12, December 1994

Activity-Dependent Regulation of Dendritic Spine Density on Cortical Pyramidal Neurons in Organotypic Slice Cultures / 1483

Casey M. Annis, Diane K. O'Dowd, and Richard T. Robertson

Expression of the Ligand-Binding Nicotinic Acetylcholine Receptor Subunit  $D\alpha 2$  in the *Drosophila* Central Nervous System / 1494

Petra E. Jonas, Bounpheng Phannavong, Renate Schuster, Christiane Schröder, and Eckart D. Gundelfinger

The Growth of PC12 Neurites Is Biased Towards the Anode of an Applied Electrical Field / 1509

R. J. Cork, M. E. McGinnis, J. Tsai, and K. R. Robinson

Expression of trk and Neurotrophin mRNA in Dorsal Root and Sympathetic Ganglia of the Quail during Development / 1517

Damin Zhang, Lihua Yao, and Paulette Bernd

GABA<sub>A</sub> Receptor Subunit Polypeptides Increase in Parallel but Exhibit Distinct Distributions in the Developing Rat Cerebellum / 1533

Laurie S. Nadler, Eman R. Guirguis, and Ruth E. Siegel

Pharmacological Characterization of a Serotonin Receptor Involved in an Early Embryonic Behavior of Helisoma trivolvis / 1545

Jeffrey I. Goldberg, Niels K. Koehncke, Kim J. Christopher, C. Neumann, and Thomas J. Diefenbach

Outgrowth Morphology and Intracellular Calcium of Crustacean Neurons Displaying Distinct Morphologies in Primary Culture / 1558 Robert A. Graf and Ian M. Cooke

GAP-43 Immunoreactivity and Axon Regeneration in Retinal Ganglion Cells of the Rat  $\,/\,$  1570

H. Schaden, C. A. O. Stuermer, and M. Bähr

Neurons in Culture Maintain Acetylcholine Receptor Levels with Far Fewer Transcripts than In Vivo / 1579

Roderick A. Corriveau and Darwin K. Berg

Involvement of Protein Kinase C in the Axonal Growth-Promoting Effect on Spinal Cord Neurons by Target-Derived Astrocytes / 1593

Jiang Qian, Hoau-Yan Wang, Itzhak Fischer, Eitan Friedman, and Pat Levitt

Target Specificity and Size of Avian Sensory Neurons Supported *In Vitro* by Nerve Growth Factor, Brain-Derived Neurotrophic Factor, and Neurotrophin-3 / 1613 Patrizia LoPresti and Sheryl A. Scott

Androgen Directs Sexual Differentiation of Laryngeal Innervation in Developing Xenopus laevis / 1625

John C. Robertson, James T. Watson, and Darcy B. Kelley

Long-Term Survival Followed by Degradation of Neurofilament Proteins in Severed Mauthner Axons of Goldfish / 1637

Jeffrey W. Moehlenbruck, Jennifer A. Cummings, and George D. Bittner

Author Index to Volume 25 / 1655

Subject Index to Volume 25 / 1661

Volume Contents/I